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Salmonellosis (Nontyphoidal)

Overview^(1,2)

For a more complete description of salmonellosis, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

Case Definition⁽³⁾

Clinical description

An illness of variable severity commonly manifested by diarrhea, abdominal pain, nausea, and sometimes vomiting. Asymptomatic infections may occur and the organism may cause extraintestinal infections.

Laboratory criteria for diagnosis

Isolation of *Salmonella* from a clinical specimen

Case classification

Confirmed: a case that is laboratory confirmed

Probable: a clinically compatible case that is epidemiologically linked to a confirmed case


Comment

Laboratory-confirmed isolates are reported to CDC via the Public Health Laboratory Information System (PHLIS), which is managed by the Foodborne and Diarrheal Diseases Branch, Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, CDC. Both probable and confirmed cases are reported to the National Notifiable Diseases Surveillance System, but only confirmed cases are reported to PHLIS. Both asymptomatic infections and infections at sites other than the gastrointestinal tract, if laboratory confirmed, are considered confirmed cases that should be reported to PHLIS.

Information Needed for Investigation

Verify the diagnosis. What laboratory tests were conducted and what were the results?

Establish the extent of illness. Determine if household or other close contacts are, or have been ill, by contacting the health care provider, patient or family members.

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Contact the Regional Communicable Disease Coordinator, if an outbreak is suspected, or if cases are in high-risk settings or jobs such as food handlers, child care, or health care.

Contact the Bureau of Child Care, if cases are associated with a child care facility.

Case/Contact Follow Up And Control Measures

If terrorist activity is suspected, contact appropriate law enforcement authorities.

- Contact the Regional Communicable Disease Coordinator
- For reports after normal office hours, contact the Center for Emergency Response and Terrorism at (800) 392-0272

Determine the source of infection to prevent other cases:

- Does the case or a member of the case's household attend a child care center or nursery school?
- Does the case or a member of the case's household
 - Work as a food handler?
 - Work as a health care provider?
 - Work in poultry or other animal operations?
 - Have contact with feces from wild or domestic animals (e.g., reptiles, fowl or poultry)?
- Has the case traveled? Where?
- Is this case related to consumption of a recalled food product?
- Does the case consume unpasteurized milk or raw eggs?
- Does the case properly prepare food and disinfect cooking utensils and food preparation surfaces?
- Have there been other cases linked by time, place or person?
- Does the case know anyone with similar symptoms?


Control Measures

See the Salmonellosis section of the Control of Communicable Diseases Manual (CCDM), "Control of patient, contacts and the immediate environment".

See the *Salmonella* Infections section of the Red Book.

General:

- Infected persons must be made aware of the importance of good handwashing with soap and water after defecation or handling raw meats, diapers, or feces. ^(1,2) Stool specimens from household contacts who have diarrhea should be cultured. ⁽²⁾
- The search for unrecognized mild cases and convalescent carriers among case contacts may be unproductive in sporadic cases and seldom contributes to the control of an

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outbreak. Cultures of contacts should generally be confined to people employed in occupations likely to expose a large number of people, and other situations where the spread of infection is particularly likely.


- For cases associated with recreational water activities or with private drinking water contact the Regional Communicable Disease Coordinator.
- If coliform bacteria are detected in a private water supply (e.g., cistern, well), advise the family to boil the water (bring water to a full rolling boil for one minute) used for drinking, food preparation, dishwashing, and tooth brushing until the problem in the water supply can be corrected.
- If cases are associated with a public water supply, notify the Regional Communicable Disease Coordinator, who will notify the Department of Natural Resources (DNR). If possible, DNR should be contacted before the collection of any public water samples.
- If fresh fruits or vegetables are suspected as the vehicle in an outbreak, trace back of the product may prevent additional cases.

Food Handlers:

- When a food handler is diagnosed with *Salmonella*, contact the Regional Communicable Disease Coordinator and the appropriate Environmental Public Health Specialist *immediately*. Food handlers should be excluded until diarrhea ceases and they are approved to return to work by either the local health department or the Missouri Department of Health and Senior Services. ⁽¹⁾
- Ill (symptomatic with diarrhea) contacts of salmonellosis patients should be excluded from food handling until diarrhea ceases and they are approved to return to work by either the local health department or the Missouri Department of Health and Senior Services. ⁽¹⁾

Child Care:

- Outbreaks of *Salmonella* infection are unusual in child care programs, however, educating child care attendants and the children on the importance of handwashing is key to preventing salmonellosis.
- All rules and guidelines regarding handwashing, toileting, diapering, and food handling, referenced in Licensing Rules for Group Child Care Homes and Child Care Centers ⁽⁴⁾ should be followed rigorously.
- When a child care worker or child who attends child care is diagnosed with *Salmonella*, contact the Regional Communicable Disease Coordinator and the Bureau of Child Care *immediately*. Child care workers should be excluded until diarrhea ceases and they are approved to return to work by either the local health department or the Missouri Department of Health and Senior Services. ⁽¹⁾
- Ill contacts of salmonellosis patients should be excluded from child care until diarrhea ceases and they are approved to return to work by either the local health department or the Missouri Department of Health and Senior Services. ⁽¹⁾

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- All children and staff who have diarrhea should be excluded from attendance until 24 hours after their diarrhea ceases.
- When *Salmonella* infection is identified in a child care attendee or staff member, stool specimens from other symptomatic attendees and staff members should be cultured.
- To prevent spread of the infection, efforts should be made to prevent the transfer of children to other child care centers. Closure of affected child care centers may lead to placement of infected children in other centers (with subsequent transmission in those centers) which is counterproductive.

Health Care:

- Health care workers (HCW) and ill contacts of salmonellosis patients should be excluded from patient care until diarrhea ceases and they are approved to return to work by either the local health department or the Missouri Department of Health and Senior Services. ⁽¹⁾

Laboratory Procedures


Specimens:

Collect clinical specimens in Cary-Blair media using the Enteric Specimen collection kit supplied by the SPHL. Specimens should be shipped refrigerated. Diagnosis is based on culture of the organism. The only clinical specimen the SPHL will test for *Salmonella* is stool. The SPHL will identify and serotype *Salmonella* from cultures submitted by other laboratories. For epidemiological purposes, the cultured organism should be tested further to determine serotype. The SPHL does this testing at no charge to the submitter.

Reporting Requirements

Salmonella is a Category II disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services in writing within three days of suspected or established diagnosis:

1. For confirmed and probable cases, complete a “Disease Case Report” (CD-1), and a “Record of Investigation of Enteric Illness” (CD-2C) revised 6/02.
2. Entry of the complete CD-1 into MOHSIS negates the need for the paper CD-1 to be forwarded to the Regional Health Office.
3. Send the completed secondary investigation form(s) to the Regional Health Office.
4. All outbreaks or “suspected” outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the Regional Communicable Disease Coordinator. This can be accomplished by completing the initial outbreak report form.
5. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the Regional Communicable Disease Coordinator.

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References

1. Chin, James, ed. "Salmonellosis." Control of Communicable Diseases Manual, 17th ed. Washington, D.C.: American Public Health Association. 2000: 440-444.
2. American Academy of Pediatrics. "*Salmonella* Infections." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th Ed. Elk Grove Village, IL. 2000: 501-506.
3. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 1997; 46 (RR-10): 31.
4. Missouri Department of Health and Senior Services, Bureau of Child Care, Licensing Rules for Group Child Care Homes and Child Care Centers, 2002.

Other Sources of Information

Donowitz, LG, ed. Infection Control in the Child Care Center and Preschool, 4th ed., Baltimore, MD, Williams & Wilkins, 1999: 264-267.

Web Sites

National Center for Infectious Diseases, Salmonellosis fact sheet
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis_g.htm (8 April 2003)

Salmonellosis

FACT SHEET

What is salmonellosis?

Salmonellosis is a bacterial infection that usually affects the intestines and occasionally the bloodstream. It is one of the more common causes of gastroenteritis with several hundred cases occurring in Missouri each year. Most cases occur in the summer months.

Who gets salmonellosis?

Any person can get salmonellosis, but it is identified more often in infants and children.

How are *Salmonella* bacteria spread?

Salmonella bacteria are spread by direct contact with an infected person, by eating or drinking contaminated food or water or by contact with contaminated object or animal.

What are the symptoms of salmonellosis?

People with salmonellosis may have diarrhea, cramping, fever, nausea, vomiting, and headache. Some people may have very mild or no symptoms but some infections can be quite serious, especially in the very young or elderly.

How soon after exposure does symptoms appear?

The symptoms generally appear 12 to 36 hours after exposure but may take days.

Where are *Salmonella* bacteria found?

Salmonella bacteria are found in many places in our food chain and environment. The bacteria often contaminate raw meats, eggs, and unpasteurized milk and cheese products. Other sources may include reptiles, chicks and other fowl, dogs, cats, and farm animals.

For how long can an infected person carry *Salmonella*?

A person can carry the bacteria from several days to many months. Infants and people who have been treated with oral antibiotics tend to carry the bacteria longer than others.

Should infected people be excluded from school or work?

People with diarrhea need to be excluded from child care, food service or any other group activity where they may present a risk to others. Most infected people may return to work or school when their diarrhea stops if they carefully wash their hands after using the restroom. Food handlers, children and staff in child care settings, and health care workers must obtain the approval of the local or state health department before returning to their routine activities.


What is the treatment for salmonellosis?

Antibiotics for *Salmonella* are usually not recommended for uncomplicated cases. Most people with salmonellosis will recover without treatment. Some may require fluids to prevent dehydration.

How can salmonellosis be prevented?

- The single most important way to prevent the spread of disease is careful handwashing. Wash hands thoroughly:
 - After use of restroom
 - Before preparation of foods
 - After handling raw meat
 - After completion of food preparation
 - After handling animals, especially reptiles, or their feces.
- Thoroughly cook all foods derived from animal sources.
- Refrigerate foods promptly; don't hold at room temperature any longer than necessary.
- Wash cutting boards, utensils, and food preparation counters with soap and water immediately after use.
- Cook poultry, ground beef, and eggs thoroughly before eating. Do not eat or drink foods containing raw eggs, or raw unpasteurized milk.
- Prevent cross-contamination. Never let raw meat and poultry, or their juices, come in contact with cooked meat or any other food, raw or cooked.

**Missouri Department of Health and Senior Services
Section for Communicable Disease Prevention
Phone: (866) 628-9891 or (573) 751-6113**

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Sample Letter to Parents of Children Exposed to Salmonellosis

DATE

To Parents of Children at

Child Care Center

Dear Parent:

A child who attends the _____ child care center has been diagnosed with salmonellosis, a disease caused by the *Salmonella* bacteria. The symptoms of salmonellosis may include diarrhea, abdominal cramping, fever, nausea, vomiting, and headache. Salmonellosis is spread by eating or drinking contaminated food or water or by contact with infected people or animals.

Children or any members of your household who develop any of these symptoms should be tested for salmonellosis by having a stool specimen examination. This can be done through your local health department. [Stool specimen kits may be picked up and returned to the child care center. We will make arrangements for them to be delivered to the health department.]* Please do not send children to the center if they have diarrhea.

An information sheet on salmonellosis is enclosed. If you have questions please contact your physician or the _____ County Health Department at [phone number].

Sincerely,

Enclosure

* Or insert other instructions appropriate to the situation.



MISSOURI DEPARTMENT OF HEALTH AND SENIOR SERVICES
SECTION OF COMMUNICABLE DISEASE CONTROL AND VETERINARY PUBLIC HEALTH
RECORD OF INVESTIGATION OF ENTERIC ILLNESS

MOHSIS CID#

Information with shaded titles is not required if entered on the CD-1 report or entered into MOHSIS.

NAME: (LAST, FIRST, MI)		DATE OF BIRTH:	AGE:	GENDER:	RACE:
		/ /			
PARENT(S) NAME IF NOT ADULT:		PHONE NO.:			
HOME ADDRESS:	CITY:	STATE:	ZIP CODE:	COUNTY:	

EMPLOYMENT / CHILD CARE (*See reverse side for High-Risk Employment information.)

PLACE OF EMPLOYMENT:	ADDRESS:	PHONE NO.:	
OCCUPATION:	JOB DUTIES:		
SCHOOL / CHILD CARE ATTENDED:	GRADE OR ROOM:		
SCHOOL / CHILD CARE ADDRESS:	CITY:	STATE:	ZIP CODE:

Symptoms:* (Check Yes or No and number the order in which symptoms first presented)

ORDER NO.	SYMPTOM	YES	NO	ORDER NO.	SYMPTOM	YES	NO	ORDER NO.	SYMPTOM	YES	NO
	Nausea	<input type="checkbox"/>	<input type="checkbox"/>		Bloody Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>		Malaise	<input type="checkbox"/>	<input type="checkbox"/>
	Vomiting	<input type="checkbox"/>	<input type="checkbox"/>		Cramps	<input type="checkbox"/>	<input type="checkbox"/>		Headache	<input type="checkbox"/>	<input type="checkbox"/>
	Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>		Chills	<input type="checkbox"/>	<input type="checkbox"/>		Dizziness	<input type="checkbox"/>	<input type="checkbox"/>
	Watery Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>		Fever _____ °	<input type="checkbox"/>	<input type="checkbox"/>		Other		

Disease

DIAGNOSIS:	ONSET DATE / TIME:*	DURATION OF SYMPTOMS:	
	/ / _____ <input type="checkbox"/> am <input type="checkbox"/> pm	_____ hrs.	
INCUBATION PERIOD:*	PHYSICIAN CONSULTED?	DATE:	HOSPITALIZED?
	<input type="checkbox"/> Yes <input type="checkbox"/> No	/ /	<input type="checkbox"/> Yes <input type="checkbox"/> No
PROVIDER NAME:	CITY:	STATE:	PHONE NO.:
TREATMENT: (TYPE, AMOUNT)			DATE:*
			/ /
<input type="checkbox"/> Recovered <input type="checkbox"/> Died	DATE OF DEATH:	CAUSE OF DEATH:	
	/ /		

Patient History (Limit patient responses to within one disease incubation period.)


TRAVEL: (OUTSIDE OF HOME COMMUNITY)	DATE(S):*	LOCATION(S):
<input type="checkbox"/> Yes <input type="checkbox"/> No		
HOME WATER SUPPLY:		
<input type="checkbox"/> Private (type) _____ <input type="checkbox"/> Bottled Water (brand) _____		
<input type="checkbox"/> Public Water District (Name) _____ Other water sources: _____		
HOME SEWAGE DISPOSAL SYSTEM:		
<input type="checkbox"/> Private (type) _____ <input type="checkbox"/> Community System (Name) _____		
RECREATIONAL WATER CONTACT: (SWIMMING POOL, LAKE, RIVER, ETC.)		
<input type="checkbox"/> Yes <input type="checkbox"/> No Type: _____ Location: _____		
Dates: _____		
PET / ANIMAL EXPOSURE: (DOMESTIC PETS, LIVESTOCK, OTHER)		
<input type="checkbox"/> Yes <input type="checkbox"/> No Pets/Animals ill: <input type="checkbox"/> Yes <input type="checkbox"/> No Animal Type(s): _____		
Date(s)* of Animal Exposure: _____		
Describe Animal Exposure: _____		
Location of Animal Exposure: _____		
Comments: _____		

Food**

	NAME	STREET ADDRESS	CITY / STATE
Grocery stores routinely used:	_____	_____	_____
	_____	_____	_____
Restaurants routinely used:	_____	_____	_____
	_____	_____	_____
OTHER FOOD SOURCES: (e.g., ETHNIC, UNPASTEURIZED, HOME CANNED)		TYPE / LOCATION:	

* Epi Calendar (reverse side) may be used to help determine time periods.
** Attach separate 3-day food history if multiple cases are known/suspected.

Please submit this form along with completed CD-1 Report on all enteric cases.

Laboratory Tests*: Record Diagnostic Information in Section 41 of CD-1 Report and/or attach copy of lab slip(s)										
Are there other associated cases? <input type="checkbox"/> Yes <input type="checkbox"/> No					If yes, how many?		How Associated:			
List ill contacts:										
NAME & ADDRESS	DOB / AGE	SEX	RELATION TO PATIENT	SIMILAR ILLNESS		ONSET DATE	LAB CONFIRMED		CD-1 AND ENTERIC FORM COMPLETED	
				YES	NO		YES	NO	YES	NO
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High Risk Employment Information (e.g., Food Handler, Child Care or Health Care Worker)										
SPECIFIC JOB DUTIES:*										
DATE(S) WORKED PRIOR TO ONSET OF ILLNESS:*						EXCLUDED FROM WORK? <input type="checkbox"/> Yes <input type="checkbox"/> No		DATE:*/ / /		
IF YES, BY WHOM:					TITLE:					
FOLLOW-UP SPECIMEN(S) REQUIRED? <input type="checkbox"/> Yes <input type="checkbox"/> No		DATE COLLECTED:*/ / /		RESULTS:*/ 1. _____ 2. _____ 3. _____						
LAB:			WERE CONTROL MEASURES DISCUSSED WITH PATIENT? <input type="checkbox"/> Yes <input type="checkbox"/> No				BY:			
RETURNED TO WORK? <input type="checkbox"/> Yes <input type="checkbox"/> No		DATE:*/ / /		EXPECTED DATE:*/ / /			EXCLUDED FROM HIGH-RISK DUTIES? <input type="checkbox"/> Yes <input type="checkbox"/> No			
SEXUAL PREFERENCE: <input type="checkbox"/> Heterosexual <input type="checkbox"/> Homosexual <input type="checkbox"/> Bisexual <input type="checkbox"/> Unknown <input type="checkbox"/> N/A									MULTIPLE PARTNERS? <input type="checkbox"/> Yes <input type="checkbox"/> No	
RECREATIONAL DRUG USE: <input type="checkbox"/> Yes <input type="checkbox"/> No		DRUGS OF CHOICE:								
*Epi Calendar:										
MONTH(S) / DATES:			YEAR:		DISEASE:			WORK:		
Sunday ____	Monday ____	Tuesday ____	Wednesday ____	Thursday ____	Friday ____	Saturday ____				
Sunday ____	Monday ____	Tuesday ____	Wednesday ____	Thursday ____	Friday ____	Saturday ____				
Sunday ____	Monday ____	Tuesday ____	Wednesday ____	Thursday ____	Friday ____	Saturday ____				
OTHER PERTINENT EPIDEMIOLOGICAL DATA (TO INCLUDE PROBABLE SOURCE):										
INVESTIGATOR: 								DATE COMPLETED:		